

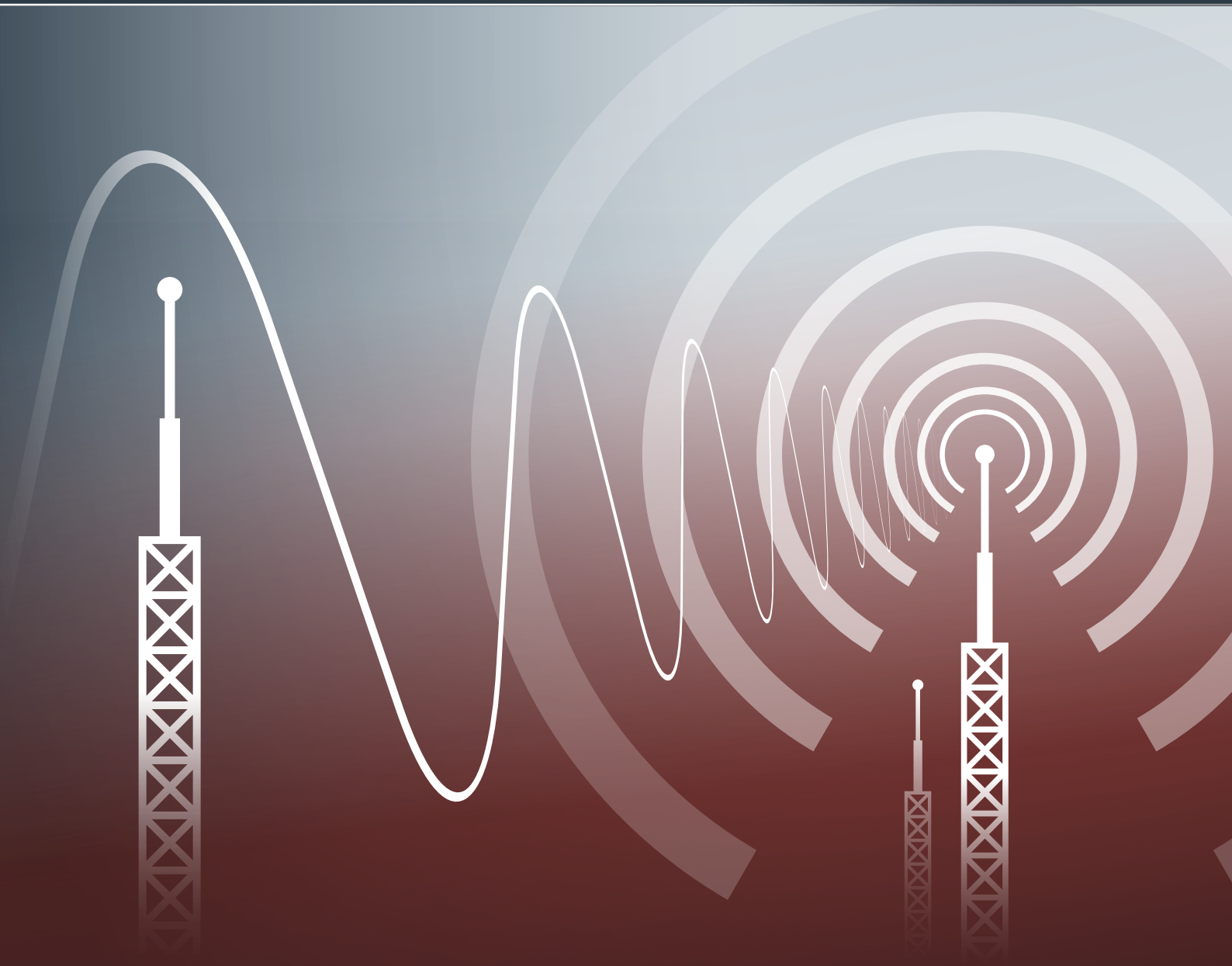


MINISTRY OF DEFENCE

Ministry of Defence

# UK Defence Spectrum Management

A Statement on:  
An Implementation Plan for Reform





MINISTRY OF DEFENCE

# UK Defence Spectrum Management

A Statement on:  
An Implementation Plan for Reform

**This Statement sets out how the Ministry of Defence plans to reform UK Defence spectrum management in 2008 - 12, and plans to extend market principles to the Ministry of Defence's use of the radio spectrum**

**Issued: 5 December 2008**

# Contents

	<b>Page</b>
<b>Section 1</b> Foreword	4
<b>Section 2</b> Executive Summary	6
<b>Section 3</b> Spectrum Management	10
<b>Section 4</b> Introducing Market Mechanisms	20
<b>Section 5</b> Managing MOD's Spectrum in the Market	34
<b>Section 6</b> Next Steps	39
 <b>Annex A</b> Glossary	 40

## Section 1

# Foreword

- 1.1** This Statement sets out the Ministry of Defence's (MOD) strategy for the management of the radio spectrum that it holds. The genesis for this strategy is the Independent Audit of Spectrum Holdings (the Independent Audit), conducted for Her Majesty's Treasury in 2005 by Professor Martin Cave. This involved a review of major spectrum holdings, especially those in the public sector, aimed at releasing the maximum amount of spectrum to the market and increasing opportunities for the development of innovative services.
- 1.2** The Independent Audit undertook a preliminary examination of the situation with respect to a number of bands that the MOD uses. It also set out a series of general recommendations as to how major public sector spectrum holdings should be managed. This involved better scrutiny of existing use of bands assigned to the public sector and longer term planning of spectrum needs, within a framework of enhanced incentives and opportunities to use spectrum efficiently.
- 1.3** The most radical proposal was that a way should be found for public sector users to make spectrum available through sale, lease, or sharing with other organisations, including commercial bodies. Amongst other things this has involved creation by the Office of Communications (Ofcom) of an instrument - recognised spectrum access (or RSA) - by which public sector holdings can be traded.
- 1.4** The MOD is very pleased to have received over 30 responses to its consultation on an Implementation Plan for Reform, which closed on 5 September 2008, and would like to thank all those who did respond and those who participated in the Industry Day, which was held on 10 July 2008.<sup>1</sup>
- 1.5** This Statement takes into account the views of those who responded to the MOD's consultation and views expressed at the Industry Day. These responses and views have helped to shape how the MOD will put the ideas of the Independent Audit into practice over the next few years.

### Is this Statement important to you?

- 1.6** As well as setting out a comprehensive new strategy for the management of the radio spectrum that it holds, this Statement discloses further information on the progress of the MOD's audits of particular bands, the outcome of the Defence spectrum demand study, the MOD's plans for RSA and the release for trade or sharing of spectrum for the wider benefit of British citizens and the UK economy.
- 1.7** The first applications of RSA for spectrum that the MOD uses will be within the 406.1 to 430 MHz band and then within the 3400 to 3600 MHz band and other bands will follow.
- 1.8** If the MOD decides to release or share spectrum from within the 406.1 to 430 MHz, 3400 to 3600 MHz, 4400 to 4500 MHz, 4500 to 5000 MHz and 5300 to 5850 MHz bands, it will set out how it intends to do so through publication of Information Memoranda. The MOD will then commence, during 2009, the process that will lead to spectrum release or sharing.

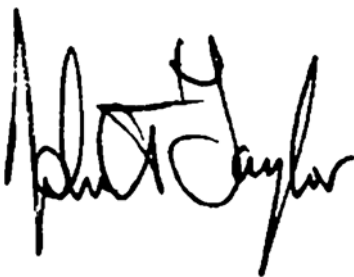
---

<sup>1</sup> <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>

- 1.9** This Statement does not disclose how much spectrum could be released. Decisions on how much spectrum could be released from particular bands will be made by the MOD based upon the data from its audit of spectrum use and future demand, audit data from those with whom it shares spectrum and the effect of spectrum usage rights under RSA arrangements for bands. Details of how much spectrum could be released and how any release will be packaged will be published in Information Memoranda. However, alongside this Statement the MOD is publishing information on the Defence Spectrum Demand study that has been carried out for the MOD by PA Consulting Group.<sup>2</sup> This study includes an independent view of how much spectrum might be released from particular bands and how it might be packaged.
- 1.10** There are a number of places in this statement where the MOD identifies dates by which it aims to complete key milestones in the process for releasing available spectrum. In particular the Statement includes dates concerning application by MOD for grant of RSA, publishing Information Memoranda for holdings of releasable spectrum, and spectrum release. The MOD is looking up to two years into the future and embarking on a process that has no precedent and where there are inter-dependencies with other government departments and agencies. Consequently there is inherent uncertainty in the MOD's planning; hence the dates in this statement are necessarily based on the MOD's best estimate of the time needed to complete the essential steps to releasing spectrum.

### **What issues are discussed?**

- 1.11** The issues discussed in this Statement include how the MOD will:
- audit the spectrum that it uses and assess its future demand for spectrum;
  - use market mechanisms to manage, exploit and acquire UK spectrum into the future;
  - manage the relationship with Ofcom and with government departments, their agencies, other public bodies and commercial users with whom the MOD shares spectrum.



**John C T Taylor**  
Director General Information  
Ministry of Defence

---

<sup>2</sup> Defence Spectrum Demand: A study for the MOD by PA Consulting Group can be found at: <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>

## Section 2

# Executive Summary

### The purpose of this Statement

- 2.1** This Statement sets out the MOD's plans for reforming the way it will manage the spectrum it uses in the UK. These reforms are a part of the Government's new framework for public sector spectrum management. The introduction of these reforms will mean that the MOD will be using market mechanisms for releasing, acquiring and managing spectrum. This is in line with the recommendations of the Independent Audit and the Government's Forward Look programme. The Office of Communications (Ofcom) is facilitating the reforms by making regulations for granting RSA to the MOD and allowing this to be traded. The scope and timetable of the MOD's spectrum release programme will be shaped by how the spectrum market develops and the outcome of ongoing discussions with other public sector bodies that currently share spectrum with the MOD. It will also depend on Ofcom making the necessary regulations. Table 3 explains when MOD will aim to release some spectrum from within prioritised bands.
- 2.2** The introduction of the MOD's reform programme is being considered within the context of its departmental budget. This is particularly important for the MOD in regard to its departmental settlement under the Comprehensive Spending Review (CSR) 2007 and future Spending Reviews since the MOD manages and uses around 35% of UK spectrum with as many as 99% of bands already having some sharing either with other public sector users or with the commercial sector. The commitments made by the MOD to spectrum reform in the Forward Look and in the CSR are set out in this section.

### What are MOD's commitments on spectrum?

- 2.3** In October 2007 the Government published the 2007 Pre-Budget Report and Comprehensive Spending Review Meeting the Aspirations of the British people.<sup>1</sup> Government said that the MOD will:
- "publish its plans for the release of electromagnetic spectrum to the market."
  - "begin the release of the bands identified in 2008 and release a significant proportion of its spectrum holdings during 2009 and 2010."
- 2.4** The publication of this Statement fulfils the first of these commitments and sets out how the MOD will achieve the second. The MOD is working with other government departments and Ofcom with the aim of being in a position, during 2009, to begin the process of releasing and sharing spectrum to deliver on the second of these commitments.
- 2.5** The MOD believes that the strategy it has set out in this Statement will help to promote the optimal use of spectrum beyond 2010 into the future and is consistent with and supportive of the Government's aims for spectrum and the market, with the potential to deliver substantial benefits to UK citizens and consumers while continuing to serve the operational needs of the armed forces.

---

<sup>1</sup> The 2007 Pre-Budget Report and Comprehensive Spending Review Meeting the Aspirations of the British people can be found at: <http://www.hm-treasury.gov.uk/>.

## Some notes on terms and definitions used in this document

### Spectrum Holdings

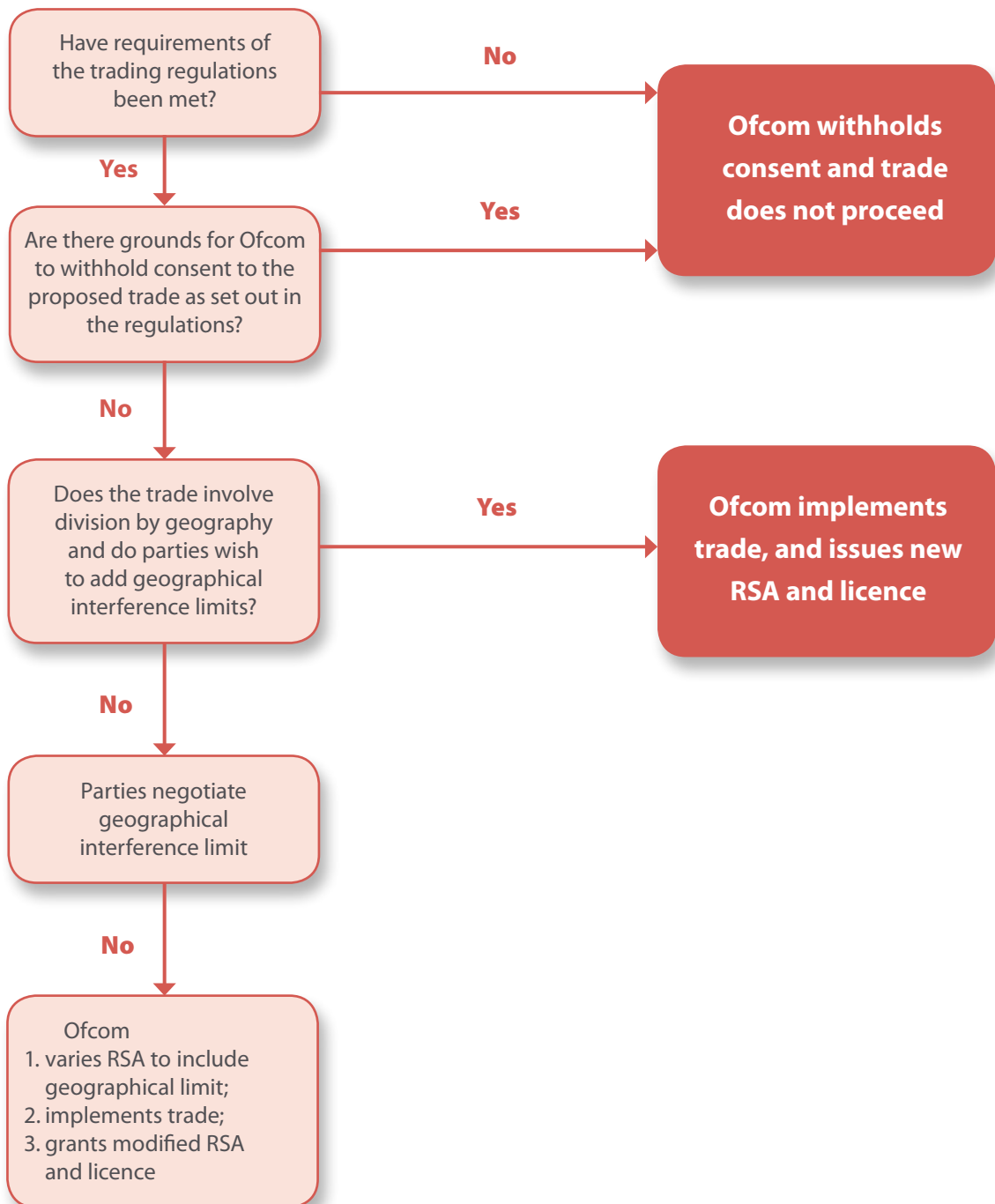
- 2.6** In the Independent Audit, the Forward Look and the previous Budget and pre-Budget Report documents the term “spectrum holdings” has been used as a generic term to encompass spectrum use identified in either a licence or, potentially, through a grant of RSA. Although the emphasis of the Independent Audit and Forward Look is on spectrum release or sharing by the public sector, it is envisaged that similar processes would apply in reverse where public sector bodies seek to acquire additional spectrum through the market. In this document these processes of releasing, sharing and seeking to add to spectrum through the market are referred to as ‘exploiting’ and ‘acquiring’ spectrum. Clarification of the term “spectrum holdings” may be found in paragraph 2.8 in Ofcom’s Statement “A Spectrum Framework Review for the Public Sector” at: [www.ofcom.org.uk/consult/condocs/sfrps/](http://www.ofcom.org.uk/consult/condocs/sfrps/)

### Spectrum trading

- 2.7** One of the key reforms of the new framework is the capacity for the MOD and other public bodies to trade spectrum. Spectrum trading involves the transfer of rights and obligations relating to spectrum in accordance with regulations made by Ofcom. Ofcom will facilitate spectrum trading by granting RSA to the MOD. However applying for or being granted RSA for a spectrum band does not necessarily mean that the MOD wishes to exploit it, only that it wishes to formalise its trading rights to the spectrum. Once those rights have been established, an investment appraisal will usually be required before the MOD decides whether to exploit it in the market.
- 2.8** How the MOD will proceed to trade spectrum using Ofcom’s trading process is illustrated in Figure 1.

**Figure 1 Ofcom's Trading Process**

(Source: <http://www.ofcom.org.uk/consult/condocs/sfrps08/sfrps08.pdf>)



*Note:*

*There are various ways (or 'modes') in which spectrum can be traded. A summary of these 'modes' can be found in Annex 4 of the Spectrum Framework Review for the Public Sector.<sup>2</sup>*

<sup>2</sup> Spectrum Framework Review for the Public Sector at: [www.ofcom.org.uk/consult/condocs/sfrps/Statement/](http://www.ofcom.org.uk/consult/condocs/sfrps/Statement/)



## **Recognised Spectrum Access (RSA)**

- 2.9** RSA is a spectrum management instrument that was introduced by the Communications Act 2003<sup>3</sup> (the 'Communications Act') for users of spectrum who do not require to be licensed under the Wireless Telegraphy Act 2006 (the 'WT Act'). Spectrum trading consists of the transfer of rights or obligations under a licence or RSA. As a Crown user, the MOD cannot engage in spectrum trading without RSA. RSA will enable the MOD to trade spectrum while also providing greater clarity and certainty about its rights and obligations, and the parallel duty on Ofcom to take account of the MOD's use of spectrum.

### **Where can I find more information on RSA?**

- 2.10** Ofcom has explained the role of RSA in promoting more efficient use of public sector spectrum. More information can be obtained on Ofcom's website at: <http://www.ofcom.org.uk/consult/condocs/sfrps/Statement/>. In that Statement, Ofcom said that it will make the necessary regulations to allow RSA to be granted to the MOD and for the MOD to trade. Ofcom has already consulted on the draft regulations for RSA for the 406.1 to 430 MHz band. To obtain RSA, the MOD will need to apply to Ofcom.

## **Spectrum Usage Rights (SUR)**

- 2.11** There are references in this document to "Spectrum Usage Rights". SURs are a way of specifying the technical terms and conditions of a spectrum licence or RSA in a way that is technology and application neutral.<sup>4</sup>

### **The structure of this document**

- 2.12** The rest of this document is arranged as follows.

- Section 3 – Spectrum Management
- Section 4 – Introducing Market Mechanisms
- Section 5 – Managing MOD's Spectrum in the Market
- Section 6 – Next steps
- Annex A Glossary

---

<sup>3</sup> The relevant provisions are now contained in the Wireless Telegraphy Act 2006.

<sup>4</sup> See <http://www.ofcom.org.uk/consult/condocs/surs/>

## Section 3

# Spectrum Management

### Spectrum is a valuable and finite resource

- 3.1** Radio spectrum is a limited resource of considerable economic and social importance. Radio spectrum is and will remain a key input and an integral component of almost all military operations. Military applications make use of radio spectrum for command, control, navigation, communications and information systems, IT (wireless LAN), intelligence gathering, surveillance, reconnaissance and targeting etc. Within the UK, the MOD's spectrum holdings support a very wide range of vital military requirements including peacetime training and operations for UK and allied nations, use for homeland security and preparations for major operations overseas.

### MOD's radio spectrum will continue to support many uses and users

- 3.2** The MOD already shares a significant proportion of spectrum with the fast-growing UK information and communications technology sector, such as broadband wireless, as well as a wide range of non-commercial applications. These include safety-of-life, search and rescue, maritime and air-space management, transport infrastructure and the emergency and science services. Analysis of future demand<sup>1,2</sup>, suggests that it is likely that total demand for Defence and private sector spectrum will exceed available supply: this will make it necessary for all users to make more efficient use of spectrum. The challenge for the MOD will be to reform the way it manages spectrum so that it can meet these changing and increasing demands.

### Using spectrum to foster innovation and competition

- 3.3** Access to spectrum is a key to innovation and competition in both the military and civil sectors<sup>3</sup> and innovation in wireless technologies is also of increasing importance to meet rising demand for both military and civil communication while on the move. The MOD will look to innovation and competition to enhance the efficient and effective use of the spectrum in the UK to benefit Defence and the wider economy. The MOD will work with other departments, Ofcom, partners and allies to give due consideration to broader competition objectives in decisions on spectrum release and sharing.

### Defence Spectrum Management

- 3.4** This Statement sets out how and when the MOD will introduce the reforms recommended by the Independent Audit to the way it will manage, exploit and acquire spectrum in the future. The MOD is taking a strategic and long-term view of the promotion of the optimal use of spectrum beyond 2010. This is consistent with, and supportive of, the Government's aims for spectrum and the market. The reforms include change to the management of spectrum for military purposes to ensure that spectrum is fully taken into consideration in the acquisition, and through-life management of Defence Capabilities and the equipment required.

---

<sup>1</sup> Independent Audit of Spectrum Holdings final report: <http://www.spectrumaudit.org.uk/pdf/caveaudit.pdf>

<sup>2</sup> Defence Spectrum Demand: A study for the MOD by PA Consulting Group can be found at: <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>

<sup>3</sup> Spectrum Framework Review: the Public Sector Proposals to extend market mechanisms to improve how spectrum is managed and used, A Consultation by Ofcom, July 2007. <http://www.ofcom.org.uk>

## The MOD's spectrum management role

- 3.5** The MOD has had a UK spectrum management role for many years and makes decisions about how spectrum is shared and used. This spectrum management role will change with the introduction of new market mechanisms. The MOD's role in the past, and how this role will change, is summarised in the Table below.

**Table 1. A summary of the MOD's spectrum management role**

The MOD:	In the past	In the future
Is allocated spectrum administratively	YES	NO*
Plans and makes frequency assignments for Defence users	YES	YES
Advises on frequency assignments	YES	YES
Grants licences	NO	NO
Uses spectrum	YES	YES
Shares spectrum on a commercial basis	NO	YES
Can trade spectrum	NO	YES
Can generate and retain income from spectrum	NO	YES

*\*Note:*

*Except where a requirement cannot reasonably be satisfied through the market and there is a mandatory international obligation or demonstrated safety or security critical need warranting ministerial direction under the terms of the Communications Act.*

## Spectrum commitments for the 2012 Olympic Games

- 3.6** This Statement should be read in the context of the UK's upcoming spectrum commitments for the London 2012 Olympic Games and Paralympic Games. Ofcom, which is responsible for spectrum planning for the London Games, published a discussion document on this in November 2007.<sup>4</sup> With the Government it is developing a draft spectrum plan for consultation in spring 2009. That consultation will identify the spectrum likely to be required for the Games. The implications for the MOD's strategy set out in this Statement will be taken into consideration, but in any event the MOD anticipates that any spectrum it provides for use for the Games will be returned after they are complete in September 2012.

## Use of UK spectrum for Defence

- 3.7** The MOD uses spectrum extensively for military and security purposes but, as a Crown body, is not licensed by Ofcom. How the MOD uses spectrum currently is set out at a high level in the UK Frequency Allocation Table (UK FAT). In the past the MOD has agreed with Ofcom the frequency bands in which it would operate and the terms on which commercial users were licensed by Ofcom in spectrum allocated for military use. In the future the MOD will seek RSA for bands that it already uses and will acquire new spectrum through the market (except where a requirement cannot reasonably be satisfied through the market and there is a demonstrated safety or security critical need or mandatory international obligation).

---

<sup>4</sup> See <http://www.ofcom.org.uk/consult/condocs/spectrum2012/statement/>

## Other UK spectrum use by Defence

- 3.8** The MOD has some limited use of UK civil spectrum. Ofcom either provides the MOD with this access or MOD secures access direct with the commercial licence holder. This use includes spectrum for Community Radio Stations and Restricted Service Licences.<sup>5</sup> The licensing arrangements for Community Radio Stations used by the MOD will be unaffected by the reform of Defence spectrum management.

## Assessing the current and future demand for Defence spectrum

- 3.9** The Government's Response and Action Plan to the Independent Audit and Forward Look action plan committed the MOD to a number of targets relating to management of public sector spectrum. One of these targets was to provide an assessment of the MOD's current and future spectrum requirements.
- 3.10** Paragraph 3.16 and 3.14 describe how the MOD is implementing the assessment of its current spectrum needs and how it will proceed in the future with spectrum audits. Paragraph 3.43 to 3.45 outline the main findings of the MOD's assessment of its future spectrum requirements – the MOD's Defence spectrum demand study.

## What we said in the consultation about the MOD's spectrum audit

- 3.11** In the consultation document the MOD said that over the next three to four years it proposed to continue with a phased approach to the audit of its remaining holdings and in subsequent audit phases that it would continue to prioritise the various audit activities. The MOD said that its use of spectrum in the UK extends to far more than the 23 bands identified and prioritised by the Independent Audit (the 'Cave Bands') and that it will appraise the costs and benefits of auditing all the bands it manages and uses. The MOD also said that it would decide on the type of database structure for spectrum information and consider a data migration plan to achieve the goal of creating a data resource that would allow effective spectrum management across all the bands that the MOD uses.

## What you said about our audit proposals

- 3.12** In the consultation the MOD asked whether all the options and factors that it should consider as it undertakes the audit had been identified and whether you had any views on the priority with which the MOD should audit its spectrum holdings.
- 3.13** Most responses agreed that the MOD had identified the options and factors that should be considered before deciding whether or not to extend the audit of the spectrum it uses and that a phased approach to extending the audit based on the prioritisation of bands was appropriate. One response said that "it has been shown beyond doubt that a level of interoperability (in military terms) or band sharing (civil terminology) can be achieved with no degradation whatsoever to the incumbent systems if mitigation is applied", suggesting that the MOD should proceed to band sharing without audits.

---

<sup>5</sup> Ofcom manages the statutory framework for awarding a Community Radio Licence and the obligations to be met by licensees are set out in the Community Radio Order 2004, which makes additions and amendments to the local radio licensing process as set out in the Broadcasting Act 1990 as amended by the Communications Act 2003. Further information on Community Radio licences can be found at <http://www.ofcom.org.uk/static/radiolicensing/Community/community-main.html>

**3.14** Specific options and factors mentioned in responses included consideration of:

- spectrum that has been harmonised at the European or global level for wireless services, such as mobile broadband, as it is more likely to generate economic benefits;
- bands where the MOD can make unfettered progress in implementing its reforms whilst achieving the best economic return;
- the prioritisation of bands and the potential market value and AIP costs/savings from bands. It was suggested that for lower priority bands not in the current phases it may be preferable to employ a lower level of detail, for a more affordable approach that would at least ensure that legacy data is retired from the current databases;
- the different factors that apply to spectrum that is shared particularly where there is a demonstrated safety or security critical need, or mandatory international obligation;
- the amount and quality of data available currently as a baseline for each of the options, which might include, amongst other things, legacy equipment use, constraints on the use of bands to ensure operational requirements are met, use by visiting and stationed forces, future demand requirements and the effect of commercialisation of bands;
- a “quick-look” approach to understand the amount of effort required for each audit option;
- the need to maintain the outputs from previous audits to ensure that they remain current and can support decision making;
- the costs and benefits of bringing spectrum to the market, but these should not be solely based on the financial gains expected at the outcome of an audit;
- placing an upper limit on audits at around 60 GHz and extending audits to 60 GHz sooner;
- use made of spectrum in rural areas and potential use by charitable and social groups;
- ensuring the efficient use of spectrum with the caveat that AIP should not be considered as the only tool for managing spectrum efficiency;
- the retention of command and control mechanisms and the associated application of administrative charges only where safety and international obligations are involved;
- peace-time operational and security needs in the UK.

**3.15** Responses to Question 2 on the priority with which MOD should audit its spectrum use highlighted the need for the MOD to prioritise the audit of a number of bands that have been made available across Europe or world-wide for commercial use.

**How MOD will proceed with audits**

**3.16** Implementing the audit of the MOD’s use of spectrum is a significant challenge that is being addressed within the MOD’s overall programme of spectrum management reform under a process-based method for effective project management. This will ensure that the implementation of the programme is co-ordinated fully between the MOD, Ofcom and other public bodies as required.

- 3.17** The first three phases of the MOD's audit have been designed to capture data for Defence systems operating, or with a requirement to operate, in the UK or UK territorial waters and air space<sup>6</sup> (including Northern Ireland). These first three phases of the MOD's audit have been programmed in line with the bands identified and prioritised by the Independent Audit.

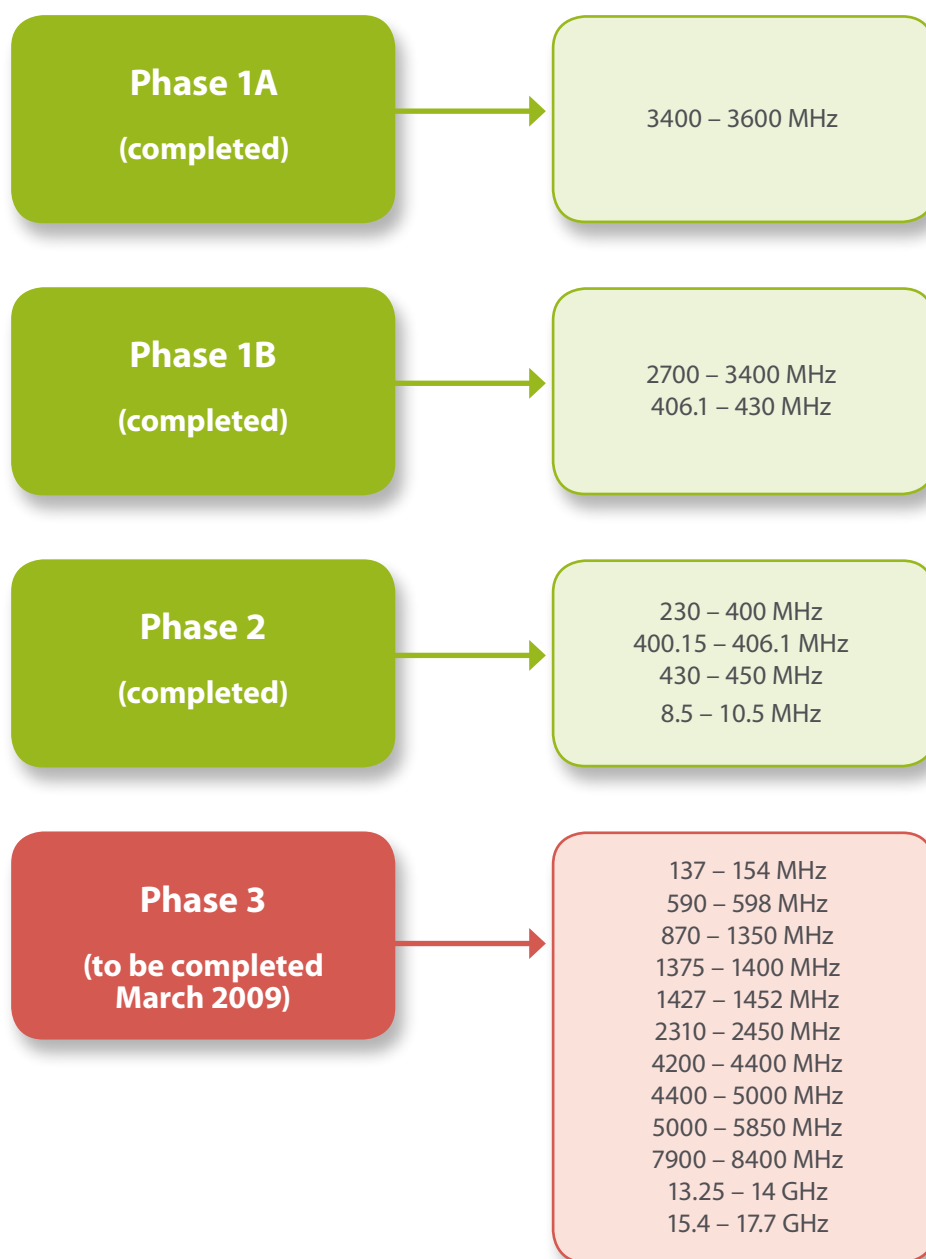
### Progress so far with the MOD's audit

- 3.18** This section summarises the progress made with respect to the audit process since the release of the MOD's consultation document on 30 May 2008. In Figure 2 the MOD's phased approach to date to the spectrum audit programme is illustrated. It has been divided into 4 main phases (1A, 1B, 2 and 3), each of which examine a number of specific bands. To date the MOD has completed phases 1A, 1B and 2, with phase 3 planned to be completed in March 2009.
- 3.19** To date, the audit has captured, cleansed and improved the MOD's spectrum data in the indicated bands. The audit data, displayed within Pilot Battle Space Management System (PBSMS), will allow the identification of potential frequencies for release as well as those frequencies which must be retained to ensure military capability is maintained, thereby supporting the broader spectrum management reform programme that the MOD is undertaking. The audit activities have also highlighted the need for further support from other organisations responsible for spectrum within the MOD to ensure the success of this broader programme.
- 3.20** Phases 2 and 3 of the audit amount to a significant amount of data discovery and improvement so to be credible this work has adhered to clearly defined processes to ensure that:
- good engineering practice has been employed and appropriate standards adhered to;
  - any data cleansing and improvement has been done in a controlled manner, with full traceability, enabling the mapping of each delivered data element back to its initial source;
  - an audit trail of all project activities exists.
- 3.21** The four stages applied by the Audit team to ensure credibility were:
- **Capture** This stage incorporated and/or corroborated information from known MOD data sources.
  - **Cleanse** This stage corrected syntax errors and identified duplicate and overlapping records.
  - **Improve** This stage appended additional data, thereby increasing the value of and confidence in the information.
  - **Deliver** This stage provided reporting of the activities undertaken, produced the data change report for each assignment and undertook migration of the audit data into PBSMS for improved visualisation and analysis.

---

<sup>6</sup> UK Airspace as defined by the relevant Flight Information Regions

**Figure 2. Spectrum audit programme**



- 3.22** Within the audit programme at each of the four stages an independent assessment has been undertaken of both the data obtained and the processes used. The work completed and lessons identified during each of these stages is summarised as follows:

### **Capture**

- 3.23** The information held within the MOD data sources has benefited the spectrum audit in that it has been captured, or has corroborated data, within the audit database. The Audit team has found that of the identified MOD sources, the Defence Spectrum Management database (the key Spectrum repository) is the basis of some of the other MOD or Single Service data sources, thereby limiting the confidence across some areas of the audit data because this data is harder to validate independently. Other MOD sources have issues such as variable granularity of data, inconsistent fields and incomplete coverage of those fields. The Capture stage has delivered a baseline version of the audit database.

### **Cleanse**

- 3.24** The Cleanse stage was delivered on time for the Phase 2 bands and supported the delivery of the MOD's target to Government. This stage delivered an enhanced version of the audit database which has acted as the baseline data set for the Improve stage.

### **Improve**

- 3.25** A significant proportion of the audit work to date has been the improvement of the records held in the database. To this end, new detailed processes have been developed which have ensured that the 85 fields per assignment have been populated with appropriate information. In addition a 'process of processes' was developed to optimise the manual data discovery with the stakeholders. The audit has also highlighted assignments which have multiple equipments associated with a single assignment.
- 3.26** The improve stage has delivered two main outputs: a complete picture of the assignments that are known and a record of those where data is incomplete. Over 4800 assignments have been improved during phase 2 alone and an audit trail has been captured where this has been the case.

### **Deliver**

- 3.27** The Deliver stage has moved the audit database into the PBSMS tool so that output data can be interrogated to show spectrum usage and give a visual representation of congestion at particular locations for individual equipments.

### **What bands will be audited next?**

- 3.28** Further audit phases will go beyond the 23 Cave Bands and eventually may cover all of the MOD's spectrum use. The MOD will continue to focus on the capture of data for Defence systems operating or with a requirement to operate in the UK or UK territorial waters and air space (including Northern Ireland). The MOD will not conduct audits of how spectrum is used by other public or civil users.
- 3.29** Taking into account all the comments received regarding the factors and options a total of 6 audit phases will be developed, but a decision to undertake further phases of the audit must provide value for money for Defence. The main focus of any investment appraisal associated with a decision by the MOD to undertake further phases of the audit will be on ensuring that requirements are based on meeting Defence capability.



- 3.30** The MOD will need to consider the cost of auditing compared to the potential benefits – for example from lower spectrum costs and incomes from future release.
- 3.31** Any decisions to audit further bands will also take into account the outcome of the MOD's business decisions regarding an enduring Third Party spectrum management arrangement.
- 3.32** The next phase (phase 4) of the audit will be of other bands above 70 MHz and below 15.7 GHz where:
- bands in this frequency range are already subject to spectrum pricing and there is evidence of demand from military, public sector or civil sectors;
  - Defence systems that depend on bands included in the first phases of the audit (e.g. the 23 Cave Bands) also depend on other (linked) bands in this frequency range.
- 3.33** The purpose of including the audit of linked bands is so that any decision to release or share spectrum from the 23 Cave Bands includes consideration of Defence systems that require a number of bands to operate to ensure that Defence outputs are met and not compromised.
- 3.34** The next phase (phase 5) will be to audit any remaining MOD managed and shared bands as well as MOD's use of civil bands above 70 MHz and below 15.7 GHz.
- 3.35** The final phase (phase 6) will audit any remaining use of spectrum by the MOD in the UK below 70 MHz and above 15.7 GHz once pricing is introduced to bands in these frequency ranges.

### **Sharing technologies**

- 3.36** The MOD is aware that certain technologies that are in development may in the future enable some bands to be shared without prior audit knowledge. However, it considers that auditing its use of spectrum is currently essential for informed decision-making.

### **When will further audits take place?**

#### **Phase 4 of the audit**

- 3.37** Business-based decisions will be needed before the MOD undertakes further audits. The MOD aims to decide whether to proceed with phase 4 of the audit early in 2009. If a decision is taken to proceed with phase 4 of the audit the MOD may issue an invitation to tender for this phase as early as possible in 2009. If a contract is awarded in 2009, the MOD will aim to complete phase 4 of the audit towards the end of 2009 so that data gathered in phase 4 of the audit can be used to inform the first planned releases of spectrum.

#### **Phase 5 of the audit**

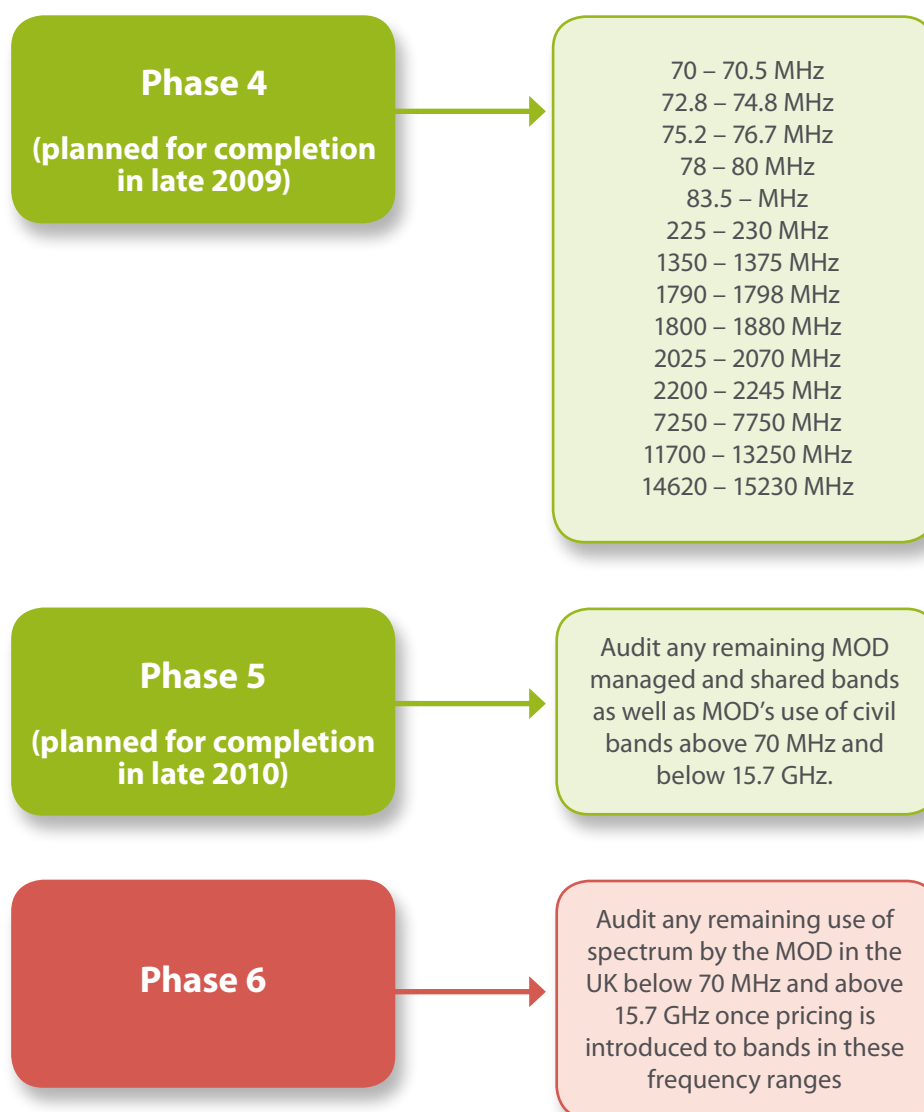
- 3.38** The MOD aims to decide on phase 5 of the audit towards the end of 2009. If the MOD decides to proceed with phase 5 of the audit it may issue an invitation to tender for this phase early in 2010. If a contract is awarded early in 2010, it will aim to complete phase 5 of the audit during 2010. However, the MOD is also planning to decide on an enduring Third Party spectrum management arrangement in this time frame. Phase 5 of the audit may be included within the scope of this arrangement. The MOD will clarify its approach to phase 5 of the audit towards the end of 2009.

## Phase 6 of the audit

**3.39** As spectrum pricing is progressively applied to new bands, the MOD may decide to proceed with phase 6 of the audit. However, the MOD is planning to decide on an enduring Third Party spectrum management arrangement before this. Phase 6 of the audit may be included within the scope of this arrangement.

**3.40** The further phases of audit and the approximate timings for completion are shown below in Figure 3.

**Figure 3. Further audit phases**



## Information on bands that are shared

- 3.41** The MOD is already introducing new spectrum management tools to help it with the migration and improvement of spectrum management data and creation of a structured data resource that will allow effective spectrum management across all the bands that the MOD uses. In addition, the MOD is considering how to improve the availability of spectrum management data to its allies and Partners, between those with whom it currently shares spectrum and to the civil spectrum market.
- 3.42** The MOD may offer other public spectrum users with whom it shares spectrum the opportunity to keep their spectrum audit data on the MOD's database in order to simplify decision making on shared bands and enable information to be held securely when necessary.

## Assessing demand for Defence spectrum

- 3.43** In the Forward Look published in March 2007, the MOD said it would provide HM Treasury with an assessment of both current and future spectrum requirements. The Forward Look also identified that in assessing any scope for action the MOD will need to take account of future uses of bands and recognised that these future uses may not as yet have been identified and quantified.
- 3.44** With a focus on the Cave Bands a UK Defence spectrum demand study has been carried out in order to establish a coherent strategy for sharing, releasing and acquiring spectrum to meet military needs and to help the MOD reconcile the demand for spectrum in the UK for civil and military use. This demand study will inform the MOD's strategy for releasing and managing spectrum in the years up to 2027.
- 3.45** The Defence spectrum demand study has been carried out independently for the MOD by PA Consulting Group supported by the University of Surrey, Department of Economics; the Cranfield School of Management Centre for Research in Economics and Finance; the Cranfield University Defence Academy; BAE Systems and Roke Manor Research.

## Summary of the Demand study

- 3.46** The Demand study has confirmed that military demand for spectrum is different to commercial demand, and is driven by the military capability requirement. Therefore the study by PA Consulting Group<sup>7</sup> has considered, through stakeholder discussion, which elements of military capability require spectrum in the UK and how those capability requirements may change with time. From this consideration the demand for spectrum in 2010 and 2015 and, with considerably less precision, out to 2027 has been determined. The spectrum demand model that has been produced as part of the study incorporates the major drivers of spectrum demand and enables the MOD to understand how future equipment retirement or deployment may impact Defence spectrum demand, including demand arising from new threat scenarios. From this, the MOD will be able to understand whether spectrum should be released or acquired to meet the military capability requirement.

---

<sup>7</sup> Defence Spectrum Demand: A study for the MOD by PA Consulting Group can be found at: <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>

## Section 4

# Introducing Market Mechanisms

- 4.1** The Independent Audit supported the introduction of market mechanisms into spectrum management as an effective way of allowing the optimal use of spectrum to be realised. The Independent Audit argued that it is not feasible to keep public sector spectrum, managed in a command and control way, completely distinct from the commercial side, where market mechanisms are being introduced. In meeting new spectrum demands for Defence, for example, the Independent Audit said that market engagement will be a necessity, as that is where the majority of candidate spectrum will lie in the future and Ofcom may not hold empty 'spare' spectrum to assign administratively. In addition it said that the process of administrative assignment is unlikely to be economically optimal or the best means of exposing public sector users to the full cost of their spectrum use.
- 4.2** Market mechanisms such as spectrum trading do not yet apply to the MOD's use of spectrum. However, the MOD already pays a fee for its use of spectrum and is subject to AIP that is comparable to that charged to commercial users for similar spectrum. It is worth noting that many bodies regarded as 'public sector' (e.g. local authorities) already secure their spectrum in a similar way to the commercial sector. However, currently the spectrum that the MOD manages and uses is not tradable. This is a barrier to the introduction of market mechanisms to the way the MOD manages spectrum and the Independent Audit recommended, and the Government and Ofcom agreed, that market mechanisms should be comprehensively extended to public sector spectrum use.

## How MOD will proceed to take advantage of market mechanisms

- 4.3** The MOD intends to take full advantage of the opportunities presented by the introduction of market mechanisms such as trading. In doing so it will ensure that sufficient spectrum remains available for national security, defence and essential public services, minimises harmful interference and ensures continued compliance with international obligations. In line with competition law, the MOD will ensure that releases of spectrum are fair, open and transparent and it will seek to make releases technology and service-neutral.

## Paying for shared spectrum

- 4.4** Government policy and resource accounting principles are that public bodies should bear financial responsibility for the spectrum they use. The MOD, like other public bodies, accordingly should pay Ofcom for the spectrum that it uses on a comparable basis (e.g. AIP) to that paid by commercial users.
- 4.5** The MOD already shares spectrum extensively with both public and commercial users. This sharing should be reflected in the spectrum charges the MOD pays unless the public bodies make payments direct to the MOD to reflect their use of the shared spectrum. The MOD is in the process of determining the extent to which other public bodies share spectrum with it and will seek to ensure through the interdepartmental machinery that the principles set out in the preceding paragraph are rigorously applied. Any disputes would be resolved through existing interdepartmental processes.
- 4.6** The MOD and Ofcom have reviewed the charging arrangements for the spectrum that the MOD uses and the MOD has audited the extent to which spectrum is shared. The MOD and

Ofcom have agreed to a Memorandum of Understanding that sets out the AIP rates and resulting fees for the period through to the end of financial year 2010/11.

### **What the MOD said in the consultation about RSA**

- 4.7** Ofcom (in section 6.6 of the Spectrum Framework Review for the Public Sector - Statement)<sup>1</sup> concluded that phasing the introduction of RSA will enable Ofcom and the public sector bodies concerned to focus resources on the frequency bands likely to generate most benefit and to gain experience of the practical operation of the new processes before applying them more widely. The Independent Audit (recommendation 2.5) concluded that work on RSA should commence in priority bands selected on the basis of the potential gains from, and practical difficulties associated with, enhanced sharing by commercial users. The MOD proposed to adopt a phased approach to applying for RSA starting with frequency bands considered of higher priority that could generate most benefit.
- 4.8** The MOD identified and proposed a number of bands for consideration and a time line for the phased approach to applying for RSA.<sup>2</sup>

### **What you said about our RSA proposals**

- 4.9** The phased approach to RSA proposed by the MOD was generally supported. Issues raised by the responses highlighted the need for the MOD to consider:
- protection for COSAPAS/SARSAT operations at 406 to 406.1 MHz;
  - determining the RSA and band sharing arrangements within the interdepartmental framework with other public bodies for bands such as 2700 to 3100 MHz;
  - the need to develop SURs in appropriate timescales that afford protection to users;
  - the rights of users licensed under the Wireless Telegraphy Act;
  - a more even spread of RSA work over the time line proposed by the MOD that takes factors such as market demands for particular bands into account;
  - a role for a Third Party in determining the timing and phasing of RSA.

### **How MOD will proceed with applying for RSA**

- 4.10** The MOD will adopt a phased approach to RSA. This phased approach and the time line for it are presented in Table 2 which identifies when the MOD expects grants of RSA to have been made to it by Ofcom, following applications to Ofcom for grants. The time line depends on a number of factors including progress with spectrum audits, Government determining the arrangements for spectrum within shared bands and Ofcom making the necessary regulations and setting the technical conditions for any grant of RSA.

---

<sup>1</sup> <http://www.ofcom.org.uk/consult/condocs/sfrps08/sfrps08.pdf>

<sup>2</sup> These bands and the time line can be found in Table 2, page 32 of the MOD's consultation document at: <http://www.mod.uk/DefenceInternet/AboutDefence/CorporatePublications/ConsultationsandCommunications/PublicConsultations/UkDefenceSpectrumManagement200812.htm>

## **RSA – By September 2009**

### **406.1 to 430 MHz**

- 4.11** Ofcom has consulted on the necessary regulations and an order for the 406.1 to 430 MHz band and on the technical conditions to be included in the grant of RSA. Information on Ofcom's consultation can be found at: <http://www.ofcom.org.uk/consult/condocs/sfrps08/summary/>
- 4.12** The MOD will apply for RSA within the band once Ofcom has made the necessary regulations. A decision on the regulations is expected to be made shortly, which would allow the grant of RSA to be made by March 2009.

### **COSPAS/SARSAT**

- 4.13** The band 406 to 406.1 MHz is limited to low power satellite emergency position-indicating radio beacons under Article 31 of the International Radio Regulations. The MOD will not apply for RSA for this band, but will work with the Department for Transport (DfT) the Civil Aviation Authority (CAA), the Maritime and Coastguard Agency (MCA) and Ofcom to ensure that the Spectrum Usage Rights specified by Ofcom are appropriate to protect COSPAS/SARSAT.

### **3400 to 3600 MHz**

- 4.14** The 3400 to 3600 MHz band supports a number of uses and users. The MOD's use of this band supports essential NATO requirements for land, airborne and naval radars. Civil uses include Programme Making and Special Events and Electronic News Gathering/Outside Broadcast (PMSE & ENG/OB), broadband wireless and amateur radio. The band also supports airborne video data links used by the Home Office, the Scottish Government and other public bodies. This band is also subject to international regulatory (ITU) provisions for International Mobile Telecommunications (IMT), which have no specific force, and a Radio Spectrum Committee (RSC) Decision, which is binding on European member states.<sup>3</sup>
- 4.15** Ofcom has not yet consulted on the necessary regulations and order and on the technical conditions to be included in the grant of RSA in this band. The MOD understands that Ofcom is currently considering how to proceed in this band in the light of international developments, including the RSC Decision referred to in the paragraph above. The timetable for RSA will depend on decisions by Ofcom on making the necessary regulations.
- 4.16** Until the RSA arrangements for the band are put in place to safeguard the rights of access for existing spectrum users, the current arrangements for sharing within the band will continue unchanged from those provided for by the UK Frequency Allocation Table as *transitional arrangements*. Further information on *transitional arrangements* is given later in this section.

---

**3** See: 2008/411/EC – Availability of frequency bands between 3400-3800 MHz for the harmonised implementation of BWA

## **4400 to 5000 MHz and 5300 to 5850 MHz**

**4.17** Having considered the responses to the consultation and the evidence of Defence demand for spectrum, the MOD has asked Ofcom to make the regulations needed to grant RSA for spectrum within the bands:

- 4400 to 4500 MHz
- 4500 to 5000 MHz
- 5300 to 5850 MHz

later in 2009. The MOD notes that these three bands are already shared with other public and civil users and that inclusion of these three bands within this time scale is a change to the plans that the MOD consulted on. The timetable for RSA will depend on decisions by Ofcom on making the necessary regulations.

## **RSA – By March 2011**

**4.18** During the period to March 2011 the MOD will ask Ofcom to make the regulations needed to grant RSA for three bands in the 4 to 10 GHz range and for four bands in the frequency range above 10 GHz. These seven bands are identified in Table 2. The timetable for RSA will depend on decisions by Ofcom on making the necessary regulations.

## **3100 to 3400 MHz**

**4.19** Although this band is not shared with the DfT, CAA and MCA it will still be necessary to establish the technical conditions for the important adjacent frequency band at 2700 to 3100 MHz which is shared for radar systems and to consider the requirements and plans for radar systems in both bands. Subject to resolution of technical issues the MOD will ask Ofcom to make the regulations needed to grant RSA for the 3100 to 3400 MHz band by March 2011.

## **RSA – By March 2012**

### **876 to 880 MHz and 921 to 925MHz bands**

**4.20** The MOD has ceased to use the 876 to 880 MHz and 921 to 925 MHz bands, but retains the holding as set out in the UKFAT. The rights of access for other spectrum users in these bands will continue unchanged from those provided for by the UK Frequency Allocation Table as transitional arrangements until Ofcom has made the necessary regulations for RSA within bands.

## **2310 to 2450 MHz**

**4.21** The MOD has not yet asked Ofcom to make the regulations needed to grant RSA for spectrum within the band 2310 to 2450 MHz, but expects to do so by March 2012. This is because the Defence demand study has identified that existing Defence use makes it unlikely that spectrum could be released without altering Defence demand and current use and that it could not be released nationally.

## **2700 to 3100 MHz**

**4.22** The MOD has not asked Ofcom to make RSA regulations for this band. However, it will be necessary for the MOD to secure access to this band into the future by agreement with the DfT. The band remains a high priority for the MOD and it is continuing to work closely with the DfT, CAA, the MCA and the Met Office in order to progress the arrangements for this band, including potential for more intensive sharing or release, as quickly as possible.

**Table 2. MOD's timetable for RSA**

<b>Date by which MOD will ask Ofcom to make RSA regulations</b>	<b>&lt; 1 GHz</b>	<b>1 – 4 GHz</b>	<b>4 – 10 GHz</b>	<b>&gt; 10GHz</b>
<b>By September 2009</b>	406.1 – 430 MHz <sup>1,8</sup>	3400 – 3600 MHz <sup>4,5</sup>	4400 – 4500 MHz 4500 – 5000 MHz <sup>8</sup> 5300 – 5850 MHz <sup>6</sup>	
<b>By March 2011</b>		3100 – 3400 MHz	7900 – 8400 MHz <sup>10</sup> 8500 – 9000 MHz <sup>9</sup> 9500 – 10125 MHz	10.125 – 10.225 GHz 10.225 – 10.5 GHz <sup>5</sup> 13.4 – 13.75 GHz 14.62 – 15.23 GHz
<b>By March 2012</b>	72.8 – 74.8 MHz 75.2 – 76.7 MHz 78 – 80 MHz 83.5 – 85 MHz <sup>7</sup> 141.9 – 143 MHz 149 – 149.9 MHz 153.5 – 154 MHz 230 – 399.9 MHz <sup>2,3,7,8</sup> 401 – 406 MHz 430 – 450 MHz 870 – 872 MHz 915 – 917 MHz	1375 – 1400 MHz <sup>8</sup> 1427 – 1452 MHz 2310 – 2450 MHz	7250 – 7300 MHz	

- 1** The band 406 to 406.1 MHz is limited to low power satellite emergency position-indicating radio beacons under Article 31 of the International Radio Regulations.
- 2** The band 242.95 to 243.05 MHz is used for military distress.
- 3** The band 328.6 to 335.4 MHz - is managed by Directorate of Airspace Policy (DAP) and MOD.
- 4** The bands 3480 to 3500 MHz & 3580 to 3600 MHz have been released to Ofcom and spectrum licences have been awarded until July 2018.
- 5** Used for emergency services in the UK.
- 6** Spectrum in the range 5300 to 5850 MHz is shared by a number of radio communication services and users. The 5600 to 5650 MHz meteorological radar band used for the UK weather radar network is within this band.
- 7** The bands 80 to 84 MHz, 235 to 328.6 MHz, 335.4 to 399.9 MHz & 3442 to 3475 MHz are shared by a number of radio communication services and users.
- 8** Radio astronomy use within the band. The 406.1 to 430 MHz band is shared by a number of radio communication services and users.
- 9** In the UK the band 8750 to 8850 MHz is allocated under the footnote provision UK2. Except by special agreement having the approval of the NFPG this frequency band, or the allocation to this radio service, is reserved exclusively for Military use in accordance with the Allocation to Services. The use of the band 8750 to 8850 MHz by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8850 MHz.
- 10** Met Office uses parts of the spectrum at 8160 MHz and 8212.5 MHz for the reception of satellite data. The EESS and Meteorological Satellite Service uses the bands 8025 to 8175 MHz and 8175 to 8215 MHz respectively.



## Review and change

- 4.23** Table 2 below summarises the frequency bands that the MOD has prioritised so far (in whole or in part) for RSA. This table also identifies spectrum that is shared where Government and Ofcom must determine the arrangements within the bands before regulations enabling the grant of RSA can be made.
- 4.24** The MOD may change the phasing and timetable for asking Ofcom to make the regulations needed for grants of RSA. The MOD's timetable (see Table below) is subject to adjustment in the light of the results of the detailed audit, changes in military and civil spectrum demand, and progress with the development of sharing arrangements and action by Ofcom to make regulations and set technical parameters for RSA.

## How RSA holders will be determined

- 4.25** In the MOD's consultation it was not possible to say how determinations will be made as to which Secretary of State should hold RSA within shared bands because that issue was still under consideration within the Government's interdepartmental committee on spectrum matters, the Spectrum Strategy Implementation Group (the SSIG).
- 4.26** The SSIG has now identified the four broad principles for deciding which Secretary of State should hold the RSA for each shared band or spectrum within a shared band. These are:
1. whether the UK FAT provides for a decision on a RSA holder based on the exclusivity of use of a frequency band or the planning and assignment of frequencies;
  2. whether an agreement between the current sharers exists that specifies responsibility;
  3. whether specific international agreements provide a basis for inter-departmental agreement for each shared band. This includes identifying departmental responsibilities for spectrum and its management under UK, EU and international law, amongst other things:
    - which department or public sector body has the primary policy interest in practice rather than in name, or responsibility for the application or policy requiring access to some or all of the spectrum; which Secretary of State or public sector body decides in practice how the spectrum is used;
    - which department or public sector /body takes the lead in international negotiations on any constraints applying to the spectrum;
    - which department or public sector body anticipates a future need to access the spectrum for their own purposes, non Departmental Public Bodies, executive agencies or 'client' spectrum users in the sector.
  4. the interests of existing Wireless Telegraphy Act licensees.
- 4.27** Using the criteria mentioned above, the SSIG has been developing an interdepartmental MoU that will identify which Secretary of State should hold the RSA for each shared band or spectrum within a shared band. The MOD expects that details of this MoU and which Secretary of State should hold the RSA within each shared band shared will be published in the Government's next Forward Look.
- 4.28** There are cases where the arrangements for spectrum between public bodies and the MOD may not be included in the interdepartmental MoU. For example, the MOD and the Met Office may formalise the arrangements for spectrum through an addendum to an existing

agreement.<sup>4</sup> Details of the arrangement for spectrum between the Met Office and the MOD may be published in the Government's next Forward Look in March 2009.

### **Interference management**

- 4.29** Ofcom has recognised that spectrum release combined with change of use might in certain circumstances involve a risk of interference.
- 4.30** The risk of interference to third parties in neighbouring bands caused by incoming use in a spectrum band that is released will be controlled by suitable conditions to be embedded in the grant of RSA.
- 4.31** In its Spectrum Framework Review for the Public Sector<sup>5</sup> Ofcom said that it intends to include a minimum of technical restrictions in grants of RSA in order to provide maximum flexibility in use of released spectrum and that, where feasible, it proposes to cast RSA in the form of technology and application neutral SURs.

### **Reporting and managing interference**

- 4.32** Ofcom will mitigate the risk of interference to spectrum users by careful design of the technical parameters of grants of RSA to the MOD. Ofcom's approach if interference occurs is set out in various documents, for example in paragraphs 6.48 – 6.50 of its statement of 31 January 2008 on the Spectrum Framework Review for the Public Sector.<sup>6</sup>
- 4.33** In some cases, the arrangements for reporting and managing interference between public sector spectrum users have already been facilitated by agreements on frequency management or technical frequency coordination in bands that are already shared. The arrangements for reporting and managing interference in shared bands where agreements on frequency management or technical frequency coordination are not yet in place are set out in the Interdepartmental MoU referred to above.

### **Spectrum Usage Rights**

- 4.34** Ofcom has published several consultation documents to develop the concept and application of SURs and has already consulted on the technical conditions to be included in SURs in the 406.1 to 430 MHz band. Setting technical conditions as SURs is expected to facilitate release of spectrum without the need to seek RSA or licence variations to accommodate changes of use. It is important, however, that the process of formulating the SURs does not cause undue delay and the MOD will continue to work with Ofcom to ensure this.
- 4.35** RSA will define the spectrum that the MOD will be able to trade should it decide to do so, but will not legally constrain the MOD's own use of spectrum for Defence purposes. This operational flexibility will be especially important in the event of a national emergency. However, under normal conditions, the MOD would as far as possible aim to keep within the terms of the RSA in its use of the spectrum.

### **Civil Contingency**

- 4.36** Operational flexibility remains especially important for the MOD in the event of a national emergency. The Civil Contingencies Act 2004 and supporting Regulations and statutory

---

<sup>4</sup> See: <http://www.metoffice.gov.uk/corporate/legal/framework.pdf>

<sup>5</sup> <http://www.ofcom.org.uk/consult/condocs/sfrps08/sfrps08.pdf>

<sup>6</sup> <http://www.ofcom.org.uk/consult/condocs/sfrps/statement/>

guidance for Emergency Preparedness establish a clear set of roles and responsibilities for those involved in emergency preparation and response like the MOD.

- 4.37** Except in circumstances allowed for by the Civil Contingencies Act supporting Regulations and statutory guidance for Emergency Preparedness the MOD will endeavour to manage and use spectrum so as to avoid situations that could give rise to interference that is unacceptable<sup>7</sup> to those public sector users with whom it shares spectrum or could cause undue<sup>8</sup> interference to other users. In the interests of other spectrum users in the public as well as the commercial sector the MOD will, in normal circumstances, endeavour to comply with the terms of the grants of RSA that it holds.

### **Spectrum sharing**

- 4.38** The MOD shares a significant proportion of spectrum with the fast-growing UK information and communications technology sector - such as broadband wireless - as well as a wide range of non-commercial applications, which include safety-of-life, search and rescue, maritime and air-space management, transport infrastructure and the emergency and science services. The MOD notes for example that the Met Office uses spectrum that it shares with the MOD in order to forecast events that may give rise to emergencies.
- 4.39** The MOD's spectrum use and those bands that it shares are identified in the UK FAT, which is drawn up and periodically revised by a sub-committee of the UK SSC, a Cabinet Office committee that discusses spectrum strategy. The UK SSC is jointly chaired by the Department for Business, Enterprise & Regulatory Reform (BERR) and MOD. It is open to any Government department or Devolved Administration that has an interest in spectrum.
- 4.40** Sharing with non-military users (public and civil) currently takes place in as many as 99% of MOD managed bands identified in the UK FAT. However, the arrangements that facilitate sharing are rarely transparent except where sharing is supported by the grant of licences by Ofcom under the Wireless Telegraphy Act. The UK FAT usually identifies the exclusivity of use of a frequency band or the bodies responsible for the planning and assignment of frequencies, but it does not identify how shared bands are planned and managed in practice between those who share it. The MOD and public bodies that share spectrum with it are working to enhance the transparency of existing sharing arrangements. The development of RSAs for bands has a vital role to play in this, but it is not practicable to introduce RSA for all the MOD's holdings in one step within every shared band. This is recognised by those who supported a phased approach to the introduction of RSA in their responses to the MOD's consultation. While RSA is phased in, transitional arrangements are needed. The MOD will make every effort during this transitional period to ensure that those who currently share spectrum with the MOD can continue to do so.

### **Transitional arrangements**

- 4.41** Until new arrangements are in place to safeguard the rights of access of spectrum users, the existing arrangements for access for existing spectrum users that share spectrum with the MOD will continue as set out in the UK FAT as transitional arrangements. The MOD will seek agreement to transitional arrangements as part of the interdepartmental MoU with those with whom it shares spectrum. The MOD will aim to put in place transitional arrangements that enhance the transparency and effectiveness of current sharing arrangements provided for by the UK FAT and facilitate a transition to arrangements based on RSA.

---

<sup>7</sup> Accepted interference means interference at a higher level than that defined as the observed or predicted interference which complies with quantitative interference and sharing criteria agreed upon by the Participants.

<sup>8</sup> Undue interference: See WT Act

## Releasing Spectrum

### Trading with commercial parties

- 4.42** The release of spectrum through spectrum trading will be governed by regulations to be made by Ofcom.
- 4.43** Frequency assignments may be traded or leased by the MOD where RSA is granted and subject to the arrangements of the interdepartmental MoU. The MOD will be able to ensure, by determining the terms of the transfer or release, that the accommodation of commercial parties takes fully into account the requirement for continuing access and availability of spectrum for Defence and national security, public safety, transport and science and others as required to meet government and departmental policy objectives, targets, and statutory duties.

### Exploiting spectrum shared with Public Bodies

- 4.44** The spectrum that the MOD uses supports a very wide range of vital military operations, training, non-commercial and safety of life applications. Paragraphs 4.25 et seq discuss the interdepartmental arrangements for determining which Secretary of State should hold the RSA within each shared band. The SSIG has also considered the arrangements for departments and other public bodies to make joint decisions on the release of spectrum to the market in which the MOD and other public bodies have an interest. The arrangements for making joint decisions on shared bands will be included in the interdepartmental MoU.

## Frequencies for distress and safety

- 4.45** Frequencies for distress and safety communications are those prescribed by APPENDIX 15 of the Radio Regulations. The provisions of APPENDIX 15 are obligatory in the maritime mobile service for stations using frequencies and techniques prescribed by APPENDIX 15 and for communications between those stations and aircraft stations. The Radio Regulations also prescribe the protection afforded to distress and safety communications. The MOD will not trade or lease spectrum specified for distress and safety communications that is subject to international agreement where to do so would be contrary to international obligations binding on the UK. The MOD has set out later in this Statement how it will manage interference.

## What the MOD said in the consultation about releasing spectrum

- 4.46** In the consultation the MOD said that it had initiated a programme of work to identify spectrum that can be released and a timetable for doing so. It also set out its proposals for the release of priority bands. We asked whether you agreed with the proposals for releasing spectrum, the priorities and the timetable including the timetable for initial releases of spectrum to the market.

## What you said about releasing spectrum to the market

- 4.47** Respondents to the consultation broadly welcomed the MOD proposals for releasing and sharing spectrum, and the priorities and phased approach for doing so. Several responses identified the importance of prioritising a number of bands below 1 GHz and spectrum between 2300 and 3800 MHz. At the Industry Day interest was expressed in prioritising bands around 4500 MHz.

**4.48** Themes emerging from the responses include:

- protection for spectrum used for distress and safety communications that is subject to international agreement ;
- arrangements for public and civil users who already share, or who are licensed under the Wireless Telegraphy Act by Ofcom, including transitional arrangements while rights of access are being formalised;
- how much spectrum might be shared or released from bands considered to be a priority;
- the publication of information for users and the market;
- exploring and enabling the opening of new markets whilst safeguarding existing investments;
- support to research and development for future commercially exploitable technology.

**Spectrum not used or shared by the MOD**

**4.49** Some responses to the consultation identified bands that the MOD neither uses nor shares. The MOD has assumed that this has been done in order to clarify the information that the MOD included in the consultation dealing with how other public bodies use spectrum. The arrangements for bands that the MOD does not use or share are a matter for those public bodies concerned.

**Releasing spectrum to the market**

**4.50** The release of spectrum will begin early in 2009 with an investment appraisal for the release of spectrum within the band 406.1 to 430 MHz. Work on the 3400 to 3600 MHz, 4400 to 4500 MHz, 4500 to 5000 MHz and 5300 to 5850 MHz bands will follow.

**4.51** Decisions to release and share spectrum from within these bands will be taken after the MOD has appraised the options open to it. These options may include releasing spectrum:

- nationally;
- nationally, but with certain geographical restrictions;
- regionally or locally in specific areas;
- within the Nations of the UK;
- on a time-shared basis when this can be facilitated by Ofcom;
- by frequency;
- to Ofcom.

**How much spectrum will MOD release?**

**4.52** Alongside this Statement the MOD is publishing the Defence spectrum demand study. For each of the Cave Bands PA Consulting Group, has included a discussion of how much spectrum might be released, either nationally or regionally.

- 4.53** This Statement does not disclose how much spectrum could be released overall. Decisions on how much spectrum could be released from particular bands will be made by the MOD based upon the data from its audit of spectrum use and future demand, audit data from those with whom it shares spectrum and the effect of spectrum usage rights under RSA arrangements for bands. Details of how much spectrum could be released and how any release will be packaged will be given when the MOD publishes Information Memoranda.

### **What will happen if MOD's plans change?**

- 4.54** If the MOD changes the plans that are set out in this Statement, for example if it decides to alter the priority of releasing or sharing bands in response to changes in military or civil demand, it may publish supplements to this Statement.

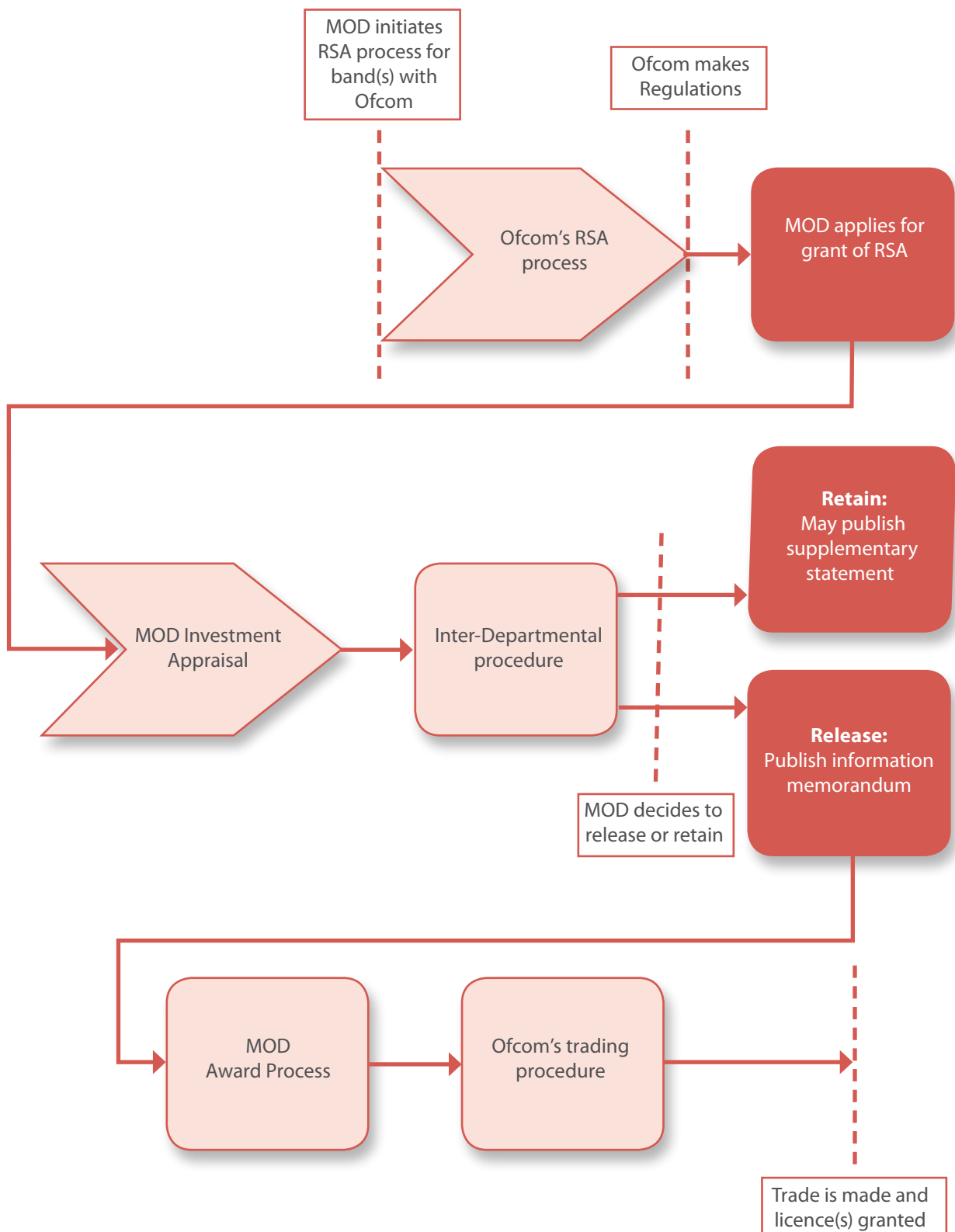
### **What transactions will be allowed?**

- 4.55** The release of spectrum can be temporary, in which case the spectrum band would revert to the MOD after a specified period of time (sometimes referred to as 'leasing'), or permanent ('disposal') and involve the entire spectrum band or part of it sub-divided by frequency or geographical coverage (referred to as 'sharing'). The term "spectrum trading" is generic and encompasses all of these. The modes of trading that are allowed will be specified by Ofcom in trading regulations but, within the scope of these regulations, it will be for the MOD to decide whether to trade and, if so, what form particular transactions should take.

### **Innovation Licences**

- 4.56** Respondents to the consultation said they would welcome the MOD exploring and enabling the opening of new markets and support of research and development for future commercially exploitable technology in the defence sector and beyond.
- 4.57** Respondents highlighted the opportunity they believe is presented by pioneer licences that could allow trials and test-bed services to be extended to develop commercial systems. Respondents indicated that these licences would provide the framework to allow test-bed activities, funded by industry and undertaken at their risk, to morph into operational systems.
- 4.58** On 9th October 2008 Ofcom issued a consultation on Innovative Uses of Spectrum. Ofcom is proposing to create a new type of licence, the "innovation licence", designed to suit uses of spectrum that can benefit from access with more flexibility than a non-operational licence.
- 4.59** If Ofcom introduces Innovation Licences as an interim measure to allow organisations to launch commercial services more rapidly than would otherwise be possible, this may have an impact on the MOD's ability to exploit spectrum, but may also afford users an opportunity to access bands earlier than the MOD's plans for releasing and sharing spectrum. Ofcom's consultation on Innovative Uses of Spectrum will close on 18th December 2008.

Figure 4. Process for releasing spectrum to the market



**Table 3. MOD aims to release some spectrum from within prioritised bands**

Date when MOD will aim to release some spectrum from within the bands	Bands			
	< 1 GHz	1 – 4 GHz	4 – 10 GHz	> 10GHz
<b>By November 2010</b>	406.1 – 430 MHz <sup>1,8</sup>	3400 – 3600 MHz <sup>4,5,7</sup>	4400 – 4500 MHz 4500 – 5000 MHz <sup>8</sup> 5300 – 5850 MHz <sup>6</sup>	
<b>By November 2011</b>			7900 – 8400 MHz <sup>10</sup> 8500 – 9000 MHz <sup>9</sup> 9500 – 10125 MHz	10.125 – 10.225 GHz 10.225 – 10.5 GHz <sup>5</sup> 13.4 – 13.75 GHz 14.62 – 15.23 GHz
<b>Beyond November 2012</b>	72.8 – 74.8 MHz 75.2 – 76.7 MHz 78 – 80 MHz 83.5 – 85 MHz <sup>7</sup> 141.9 – 143 MHz 149 – 149.9 MHz 153.5 – 154 MHz 230 – 399.9MHz <sup>2,3,7,8</sup> 401 – 406 MHz 430 – 450 MHz 870 – 872 MHz 915 – 917 MHz	1375 – 1400 MHz <sup>8</sup> 1427 – 1452 MHz 2310 – 2450 MHz 3100 – 3400 MHz	7250 – 7300 MHz	

- <sup>1</sup> The band 406 to 406.1 MHz is limited to low power satellite emergency position-indicating radio beacons under Article 31 of the International Radio Regulations.
- <sup>2</sup> The band 242.95 to 243.05 MHz is used for military distress.
- <sup>3</sup> The band 328.6 to 335.4 MHz - is managed by Directorate of Airspace Policy (DAP) and MOD.
- <sup>4</sup> The bands 3480 to 3500 MHz & 3580 to 3600 MHz have been released to Ofcom and spectrum licences have been awarded until July 2018.
- <sup>5</sup> Used for emergency services in the UK.
- <sup>6</sup> Spectrum in the range 5300 to 5850 MHz is shared by a number of radio communication services and users. The 5600 to 5650 MHz meteorological radar band used for the UK weather radar network is within this band.
- <sup>7</sup> The bands 80 to 84 MHz, 235 to 328.6 MHz, 335.4 to 399.9 MHz & 3442 to 3475 MHz are shared by a number of radio communication services and users.
- <sup>8</sup> Radio astronomy use within the band. The 406.1 to 430 MHz band is shared by a number of radio communication services and users.
- <sup>9</sup> In the UK the band 8750 to 8850 MHz is allocated under the footnote provision UK2. Except by special agreement having the approval of the NFPG this frequency band, or the allocation to this radio service, is reserved exclusively for Military use in accordance with the Allocation to Services. The use of the band 8750 to 8850 MHz by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8850 MHz.
- <sup>10</sup> Met Office uses parts of the spectrum at 8160 MHz and 8212.5 MHz for the reception of satellite data. The EESS and Meteorological Satellite Service uses the bands 8025 to 8175 MHz and 8175 to 8215 MHz respectively.



## **Priority and timetable for release of spectrum to the market**

- 4.60** Table 3 below is a summary of the priority and timetable of when MOD will aim to release some spectrum from within prioritised bands to the market. The MOD's aim is to give the market more clarity than before about likely future opportunities to obtain access to new spectrum, including the relative priority of releasing different bands. The MOD has therefore published further information about Defence spectrum demands alongside this Statement.
- 4.61** In advance of the release of spectrum to the market the MOD will publish information memoranda or it may publish supplements to this Statement if its plans for release change. The Figure overleaf explains the process.

## **How Defence plans to acquire spectrum in the future**

- 4.62** The Independent Audit recommended that there should be a presumption that new public sector spectrum needs should be met through the market in all but exceptional cases. The Government is considering the framework for acquisitions by one public body from another and from the market. Further information on how the MOD could interact with the market to acquire spectrum is given in Section 5 of this Statement.
- 4.63** Before seeking to acquire spectrum from the market the MOD will make an appraisal of the benefit to Defence of doing so using the Government's and the MOD's established methods for investment appraisal.
- 4.64** For the MOD the appropriate investment appraisal framework supplements the Treasury's "Green Book - Appraisal and Evaluation in Central Government".
- 4.65** In addition to the process of investment appraisal it may be necessary to undertake an Impact Assessment (IA). An IA is intended to ensure that thorough consideration is given to the consequences of policy choices.

## Section 5

# Managing MOD's Spectrum in the Market

### What the MOD said in the consultation about market engagement

- 5.1 Section 6 of the MOD Consultation Document dealt with the management of MOD spectrum in the market, building in particular on the suggestion from the Independent Audit that there might be benefit in having a Third Party to lead on market engagement.
- 5.2 A number of questions were posed under Section 6. These were intended to focus on the most important issues to be addressed by the MOD in its options analysis. The MOD asked which issues should be considered when evaluating options, and if so, why; either in respect of issues already identified in that section or additional issues not identified.
- 5.3 Elsewhere in the consultation document, the MOD outlined that there are spectrum bands already identified (the "Initial tranche(s)") that it wishes to initiate the market release process for early and most likely in advance of any enduring market engagement arrangements being in place. Information about how the MOD intends to take this forward is provided below under the heading *Way Forward*.

### What you said about market engagement

- 5.4 The majority of respondents believed that the MOD consultation document had been comprehensive in setting out the range of issues that needed to be resolved in taking forward the MOD's future market engagement mechanisms. A number of respondents helpfully identified further issues that the MOD should consider and potential additional aspects to the scope and role of the Third Party.
- 5.5 Set out below is a summary of the response to the consultation questions posed in Section 6 and the MOD's comments on the points that have been made.
- 5.6 Opinion was divided over which option outlined in paragraph 6.7 of the consultation document, or any alternative option, MOD is best adopting to take forward its plans for spectrum market engagement.
- 5.7 Some respondents expressed a specific preference for Option 3 (i.e. the use of a Third Party to manage, exploit and acquire spectrum on the commercial market). It was felt by many respondents expressing a preference for this option that an internal organisation would be unlikely to have the skills, depth of experience and market knowledge necessary to engage effectively with the market and that these requirements would be more likely to be met through the engagement of a Third Party with these competences. A number of respondents expressed a concern that, under Option 3 in particular, it would be vital to safeguard the interests of existing sharers through robust interference management, especially in the areas of national security and safety of life.
- 5.8 A smaller number of respondents expressed no preference and a similar number of respondents felt strongly that MOD should pursue Option 1 (hand spectrum back to Ofcom for its management). Two respondents proposed alternative options.

## Cease to hold and manage spectrum and hand spectrum to Ofcom (Option 1)

- 5.9** A number of respondents felt that this option is an inappropriate route for MOD to take. It was felt it would be inconsistent with the Independent Audit and the Forward Look programme, would not open spectrum up to full market forces and would lead to a loss of MOD control over military spectrum (with associated risk because Ofcom does not have the specialist domain knowledge to understand MOD's needs and those of a rapidly developing market place). However, respondents also recognised that it may be appropriate for MOD to return spectrum to Ofcom in particular circumstances.
- 5.10** In the event that MOD identifies significant contiguous blocks of spectrum (defined by frequency and geography) for which it has no further use for its own purposes, then it will consider the option of returning that spectrum to Ofcom as part of its investment appraisal for release. This is in line with the Government's view, with which Ofcom agrees, that it is in general preferable for public bodies to engage directly with the market instead of returning spectrum to Ofcom. However, as recognised by Ofcom, there might be circumstances in which it would be appropriate to return spectrum to Ofcom and the MOD will consider on a case-by-case basis whether an exception to the general preference for direct engagement with the market would be justified.<sup>1</sup>
- 5.11** In the event that the MOD has an enduring business requirement within a spectrum holding, even if it is able to release some of the spectrum within that holding for use by others, it would not consider the option of returning the spectrum to Ofcom to be managed on its behalf.

## Combining market engagement with management of MOD's own spectrum usage (Combining Options 2 and 3)

- 5.12** In addition to engaging with the market for the release (or acquisition) of spectrum (the Third Party role), the MOD has a substantial and enduring need to manage its own use of spectrum (the internal band manager role). A number of respondents identified that there may be benefit in combining these two needs in a single role and that interface issues and conflict may arise where the roles are separate and ill defined and/or badly managed. The potential benefits are that:
- a role with a combined remit to better facilitate the MOD's own use of spectrum and to create value in releasable spectrum may be better able to identify opportunities to meet both objectives;
  - if the MOD releases spectrum that requires ongoing band management and the MOD continues to be a user in that band, then the two roles are potentially overlapping.
- 5.13** However it would also:
- increase the scope of the role significantly in a way that may restrict the opportunity to bring optimum skills and commercial models to bear on the new challenges of spectrum trading;
  - most likely entail the MOD establishing, from the outset, a single entity on which it would rely for market engagement for all spectrum that it may release in future, precluding options around the use of multiple Third Parties.

---

<sup>1</sup> Ofcom's Spectrum Framework Review for the Public Sector – statement, Paragraphs 4.4 – 4.6: <http://www.ofcom.org.uk/consult/condocs/sfrps/statement/statement.pdf>

- 5.14** Therefore, the MOD will develop these as two distinct roles. In doing so it does not preclude the possibility that they may be combined (perhaps once the MOD's market engagement for spectrum trading has matured to a recognised set of business models) if this could be demonstrated to offer incremental benefit.
- 5.15** In choosing to treat them as separate roles it is recognised that:
- it will be necessary to define an effective interface between the two to support the effective identification of releasable spectrum; and
  - where the MOD releases spectrum in a way that demands significant ongoing band management and the MOD continues to be a user in the band, that the role of band manager could be fulfilled by either the MOD 'internal band manager' or the 'Third Party' or a combination of the two.

### **Should there be a single or multiple Third Party organisation(s)?**

- 5.16** Several respondents identified that careful consideration needed to be given to the issue of whether there should be a single or multiple Third Party organisation(s) for the MOD and/or the wider public sector. These points were well articulated and strong arguments were made for both approaches. Particular concerns were expressed about the potential "one to many" issue for spectrum users and acquirers, through having to deal with a number of spectrum sources to secure the spectrum they require and deal with spectrum management issues.
- 5.17** There may be considerable diversity in the nature of any spectrum that the MOD is able to release, both in terms of its application and in terms of the industry sectors to which it may have value. This may, in turn, lead to considerable diversity in the nature of the market engagement required, for example the mechanics of each transaction and the duration of the arrangements that it establishes. The skills and capability of any entity responsible for effecting that engagement will need to be matched to this need. Since the MOD cannot predict with certainty the nature of any spectrum releases which it is able to make in the medium to long term, the MOD must assume that such diversity will be required. There does not appear to be a mature market with single sources of supply of the market engagement services that the MOD may require, but the component expertise and capabilities almost certainly do exist, dispersed across many organisations that are diverse in terms of size and business focus. These considerations tend to favour a model where the MOD is able to engage with different third party entities according to the nature of the spectrum under consideration.
- 5.18** Conversely, it is also recognised that fragmentation of the MOD's arrangements for market engagement could create inefficiencies for those seeking to acquire spectrum in the market, particularly where there is an enduring interaction required as opposed to occasional discrete transactions. Fragmentation could also be sub-optimal for the MOD, if it were to create multiple contract interfaces to manage and integrate, which undermined continuity and resulted in inefficiency and increased costs. To the extent that such inefficiencies may reduce the value of spectrum in the market or increase the costs of market engagement, they would not be in the MOD's interests either.
- 5.19** Therefore, the MOD will need to create a model for market engagement which is capable of reconciling these issues. It may be appropriate that Third Parties are engaged through a single entity, which has limited standing resource and whose primary role is to act as a 'commissioner' and effect the range of transactions required and manage and monitor the integration of the relationships and interfaces created. The role of this single entity may be performed by the MOD, another public sector body or a Third Party acting on the MOD's behalf. Also, as

experience is gained, it might be possible to take advantage of synergies, similarities and economies of scale to rationalise the number of Third Parties.

### **Duration of any Third Party arrangement**

**5.20** Several respondents expressed a view that a longer contract term (ten plus years was suggested in one response) is more appropriate for any Third Party appointment. The MOD currently has an open mind about what is an optimum contract length in this case and will be undertaking an assessment to determine what it might be. The MOD believes this issue is linked to whether there should be a single Third Party or multiple Third Parties and also to a number of other factors such as:

- the extent to which the MOD wishes to develop a 'partnership' relationship with any Third Party;
- the nature of the Third Party's obligations;
- the risk sharing, payment and incentive arrangements;
- the value of any set-up costs and the extent of any investment required by the Third Party.

### **The use of Spectrum Brokers**

**5.21** 'Spectrum Brokers' were identified as a potential alternative option for engaging with the market when combined with the MOD continuing to manage military use of spectrum and reform defence related spectrum. Spectrum Brokers would be organisations external to the MOD which trade in spectrum, creating more efficient trading between acquirers and providers of spectrum. It is envisaged that in some cases the Spectrum Brokers would simply bring the parties together and in other circumstances they may buy and sell spectrum and accumulate spectrum holdings. It was recognised that Spectrum Brokers are only just emerging and a number will be required to ensure a fully efficient market.

**5.22** The MOD regards the emergence of Spectrum Brokers as an initiative that is best led by the market, albeit facilitated by the policy and regulatory framework provided by Ofcom. Whilst the MOD does not regard itself as in a position to take a lead on this, it is possible that its spectrum reform activity may work as a catalyst to stimulate the market in this area. The MOD intends that any Third Party arrangements it might put in place will be structured in such a way so as to be flexible enough to accommodate access to any emerging Spectrum Brokers.

### **The MOD will need a robust and comprehensive business case**

**5.23** A number of respondents identified the need for the MOD to ensure it constructs a robust and comprehensive business case as a basis to take forward its future market engagement proposals and especially where its preferred approach is for the engagement of a Third Party. In particular, respondents believed that any identified benefits should be carefully weighed against the additional costs and risks of engaging with a Third Party.

**5.24** Some respondents also wanted the business case for each spectrum release to take proper account of the wider economic and social benefits of spectrum release options and for costs to be assessed in a fair and equitable way to ensure rural and low populated areas are not disproportionately disadvantaged by the MOD's decisions.

**5.25** The MOD faces a range of options for the engagement of a Third Party and it is important that robust analysis accompanies the decision to proceed along a given route. The MOD will be completing a full investment appraisal to ensure that this requirement is met and that the

most beneficial option is chosen for both the potential engagement of a Third Party and each proposed release of spectrum.

### **Way forward**

- 5.26** The MOD wishes to progress as quickly as possible with the sharing and release of available spectrum in the bands forming its Initial Tranche (namely 406.1-430 MHz, 3400-3600 MHz, 4400-4500 MHz, 4500-5000 MHz and 5300-5850 MHz). In order to support the MOD with this, it is proposing to put in place interim Third Party market engagement arrangements. The MOD will continue to progress its plans for enduring market engagement arrangements in parallel and seek to ensure its interim arrangements do not prejudice or conflict with its plans for the enduring arrangements.
- 5.27** Subject to a Business Case and the necessary approvals, the MOD expects to put in place its interim arrangements for the Initial Tranche(s) during 2009 and anticipates:
- formally engaging with potential suppliers early in 2009;
  - awarding a contract by mid-2009.
- 5.28** Assuming that the MOD decides its enduring market engagement arrangements should be met through a Third Party, it anticipates developing and securing approval to a business case for these during the next financial year. This will allow the application of any lessons learned that emerge from its interim arrangements. The MOD expects to have its enduring market engagement arrangements in place during financial year 2010-2011.

## Section 6

# Next Steps

- 6.1** Following the publication of this Statement the MOD will apply to Ofcom for a grant of RSA for spectrum within the band 406.1 to 430 MHz when the regulations are made and to ask Ofcom to make the regulations needed to grant RSA within the bands 3400 to 3600 MHz, 4400 to 4500 MHz, 4500 to 5000 MHz and 5300 to 5850 MHz by September 2009.
- 6.2** The implementation of any proposals to extend trading, liberalisation or RSA to the spectrum that the MOD holds will require Ofcom to make various regulations, for example to specify the frequency bands in which RSA will be introduced and the procedures for trading. As required by section 122 of the WT Act, Ofcom will publish a Statutory Notice in advance of making these regulations, giving at least one month to comment.<sup>1</sup> Ofcom has already consulted on the regulations and the technical conditions to be included in RSA for the 406.1 to 430 MHz band.<sup>2</sup>
- 6.3** If the MOD decides to release or share spectrum from within the 406.1 to 430 MHz, 3410 to 3600 MHz, 4400 to 4500 MHz, 4500 to 5000 MHz and 5300 to 5850 MHz bands, it will set out how it intends to do so in Information Memoranda, which it will publish before proceeding. The MOD will then commence, during 2009, the process that should lead to spectrum release or sharing.
- 6.4** Subsequently, during the period 2011 to 2012 the MOD expects to implement further reforms that will include:
- applying for RSA for bands in a phased way according to the timetable set out in this Statement;
  - deciding on the use of Third Party services to assist with any further sharing or release that the MOD may decide to make.
- 6.5** Assuming that the MOD decides to proceed with an enduring Third Party arrangement, it anticipates:
- formally engaging with potential suppliers early in 2009;
  - awarding a contract by mid-2009.

## What will happen if MOD's plans change?

- 6.6** If the MOD significantly changes the plans that are set out in this Statement, for example if it decides to alter the priority of releasing or sharing bands in response to changes in military or civil demand, it may publish supplements to this Statement.

---

<sup>1</sup> Spectrum Framework Review: the Public Sector Proposals to extend market mechanisms to improve how spectrum is managed and used, A Consultation by Ofcom, July 2007. <http://www.ofcom.org.uk>

<sup>2</sup> <http://www.ofcom.org.uk/consult/condocs/sfrps08/sfrps08.pdf>

# Glossary

<b>AIP</b>	Administered incentive pricing – setting charges for spectrum to reflect the value of the spectrum in order to promote efficient use of the spectrum.
<b>Allocation</b>	Used of a frequency band. Entry in the table of frequency allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radio communications services or the radio astronomy service under specified conditions. This term is also applied to the frequency band concerned.
<b>Assignment</b>	Used of a radio frequency or radio frequency channel. Authorisation given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.
<b>BERR</b>	Department for Business, Enterprise & Regulatory Reform (formerly the Department of Trade and Industry).
<b>CAA</b>	Civil Aviation Authority – the independent statutory regulator responsible for regulating aviation, including economic and safety aspects.
<b>Command and control</b>	A way of managing the radio spectrum in which the regulator makes all the key decisions including what the piece of spectrum is to be used for and who can use it.
<b>Communications Act</b>	The Communications Act 2003, which sets out Ofcom’s powers, functions and duties.
<b>Concurrent</b>	(Of spectrum trading) a transaction in which rights and obligations are transferred while continuing to be rights and obligations of the transferor, cf outright.
<b>CSR</b>	Comprehensive spending review. Part of the Government’s framework for setting public expenditure.
<b>DCLG</b>	Department of Communities and Local Government
<b>DoH</b>	Department of Health
<b>DfT</b>	Department for Transport
<b>E&amp;PSS</b>	Emergency and public safety services
<b>Exemption</b>	Exemption regulations made by Ofcom allow anyone to use specified radio equipment without the need to have a WT licence.
<b>FWA</b>	Fixed Wireless Access – means of connecting to homes and offices using wireless as opposed to copper wires or fibre optics.



<b>GHz</b>	Gigahertz – unit of frequency equal to one thousand MHz.
<b>Harmful interference</b>	Interference that creates danger or a risk of danger or degrades, obstructs or repeatedly interrupts a transmission or broadcast.
<b>Harmonisation</b>	The identification of common frequency bands throughout a region (eg Europe) for a particular application and, in some cases, technology.
<b>Hz</b>	Basic unit of frequency – one hertz is equivalent to one cycle per Second.
<b>Interference</b>	Unwanted disturbance caused in a radio receiver or other electrical circuit by electromagnetic radiation emitted from an external source.
<b>ITU</b>	International Telecommunication Union - the United Nations agency for information and communication technology responsible for developing and publishing the International Radio Regulations.
<b>Market mechanisms</b>	Approach to managing spectrum where key decisions, e.g. on acquiring or disposing of spectrum and what service to provide are made by spectrum users rather than by the regulator.
<b>MCA</b>	Maritime and Coastguard Agency – an executive agency of the DfT.
<b>MHz</b>	Megahertz – unit of frequency equal to one million Hz.
<b>MOD</b>	Ministry of Defence
<b>MoU</b>	Memorandum of Understanding
<b>NPIA</b>	National Policing Improvement Agency
<b>Opportunity cost</b>	The cost of a decision or choice in terms of the benefits which would have been received from the most valuable of the alternatives that was foregone.
<b>Outright</b>	(Of spectrum trading) a transaction in which the transferred rights and obligations pass to the transferee and are no longer rights and obligations of the transferor, cf concurrent.
<b>Partial</b>	(Of spectrum trading) a transaction in which some of the rights and obligations are transferred while others are kept by the transferor, cf total.
<b>PMSE</b>	Programme Making and Special Events – a class of radio application that supports a wide range of activities in entertainment, broadcasting, news gathering and community events.
<b>PSSPG</b>	Public Safety Spectrum Policy Group
<b>PSSTG</b>	Public Spectrum Safety Test Group
<b>Radio Regulations</b>	International Radio Regulations made by the ITU, which have the status and force of a treaty, allocate frequencies globally to various applications and deal with cross-border interference.

<b>Radio spectrum</b>	The portion of the electromagnetic spectrum below 3000 GHz that is used for radiocommunications.
<b>RSA</b>	Recognised Spectrum Access - a spectrum management instrument created by the Communications Act to complement WT licences.
<b>RSC</b>	Radio Spectrum Committee
<b>RNSS</b>	Radionavigation satellite service
<b>Spectrum</b>	The electromagnetic spectrum ranging from visible light to x-rays and gamma rays.
<b>Spectrum liberalisation</b>	Removal of restrictions from WT licences and RSA to allow holders greater flexibility to change how they use spectrum.
<b>Spectrum trading</b>	Ability of spectrum users to transfer rights and obligations under WT licences to another person in accordance with regulations made by Ofcom. Trades may be total, partial, outright or concurrent.
<b>SSIG</b>	Spectrum Strategy Implementation Group. Inter-departmental committee leading on spectrum reform. A sub-committee of the UKSSC.
<b>Standardisation</b>	Development of an open standard for a particular type of equipment.
<b>STFC</b>	Science and Technology Facilities Council, formerly the Particle Physics and Astronomy Research Council.
<b>SUR</b>	Spectrum usage rights – a way of formulating the terms and conditions in a WT licence or RSA in a way that is independent of technology or service.
<b>Total</b>	(Of spectrum trading) a transaction in which all of the rights and obligations are transferred from transferor to transferee, cf partial.
<b>UK FAT</b>	The UK Frequency Allocation Table. This identifies responsibilities for the management of frequency bands or services showing whether they are managed by Ofcom, the MOD or another Government department or Agency. It also includes the ITU Table of Frequency Allocations contained in the current Radio Regulations. It is published by Ofcom on behalf of the National Frequency Planning Group, a sub-committee of the UKSSC.
<b>UKSSC</b>	Cabinet Office committee that discusses matters relating to the use of the radio spectrum, including by government departments and other public sector bodies.
<b>VHF</b>	Very high frequency (30-300 MHz).
<b>WRC</b>	World Radiocommunication Conference - conference of the ITU that revises or amends the International Radio Regulations.
<b>WT Act</b>	The Wireless Telegraphy Act 2006, which sets out the statutory framework for management of the radio spectrum consolidating a number of older Acts dating back to 1949.

**WT licence**

Licence granted by Ofcom to authorise installation or use of radio equipment as required by section 8(1) of the WT Act.

**WT Register**

Register maintained by Ofcom containing information about grant, renewal, transfer, revocation or variation of WT licences and RSA.